

# **THE ROLE OF COMPUTER AND INTERNET ACCESS IN BUSINESS**

## **STUDENTS'ACCEPTANCE OF E-LEARNING TECHNOLOGY**

### **CHAPTER 1**

#### **INTRODUCTION**

The advent of the personal computer and the Internet has inevitably changed the way we live. These technologies, as well as others, have altered the method in which people work, communicate, shop, and even learn. Distance education, a form of education traditionally associated with correspondence courses, has benefited greatly from the new technological devices of the 21<sup>st</sup> century. Today, communication tools such as e-mail, satellite connections, and video conferencing software have provided educators with the tools to provide synchronous as well as asynchronous communication with their students.

At the postsecondary level, distance education has grown tremendously. Online courses, which may or may not provide teacher-student interaction, are becoming the most common form of distance education at the postsecondary level. According to a study conducted by the Sloan Consortium, approximately 90% of all public institutions offer online courses (Allen & Seaman, 2004). In many of these online courses, instructors have simply placed their traditional course information on a website, failing to consider the interaction needed to facilitate learning. Lectures in the form of transcripts or PowerPoint presentations are often used without considering the various learning styles of different students. Research has shown that students who take online courses are extremely concerned about teacher-student interaction. (Beard & Harper, 2002; Perreault, 2002). Students want to receive continuous feedback from their instructors in an online

setting. They also want their instructor to be accessible when they have a problem or concern (Huang, 2002).

Because many online instructors and students face the aforementioned problems, numerous institutions are choosing the concept of web-based or hybrid courses to address the various issues surrounding distance learning. In web-based courses, many of the techniques such as placing assignments on a website and using chat rooms are incorporated as a supplement to learning. In this type of course, class attendance is still required. In hybrid courses, instruction is not totally online. Periodically, students physically attend class. These alternatives allow for face-to-face student-teacher interaction while taking advantage of technology (Theriot, 2004).

To assist in the delivery of web-based and online courses, many institutions and educators have adopted electronic-learning (e-learning) systems. E-learning systems provide educators with an easy method to manage course content and student interaction on the web. These courseware packages can be utilized in a totally online setting or as an enhancement to traditional classroom learning. While many institutions have implemented e-learning software packages such as WebCT and Blackboard, limited attention has been given to the perceptions of students concerning these systems. Although research has shown that students are receptive to the idea of online learning, few studies have been conducted concerning whether students embrace the concept of using e-learning systems within a classroom setting.

In addition to the concern of student acceptance of e-learning systems, technological access and computer use seem to be a major hurdle for educators to overcome (Glenn, 2005). Many students who would like to take advantage of the many

benefits of e-learning are unable to do so or find it difficult because of limited technological resources. In many instances, the underlying reason for this problem involves the socioeconomic status of an individual, resulting in the digital divide.

The digital divide is the gap between those who have access to computers and the Internet and those who do not (Vail, 2003). According to a University of California-Los Angeles study, while 80.1% of freshman at predominantly White private institutions use e-mail, only 48% of students at private historically Black colleges and universities (HBCU) and 41.1% at public HBCU report using e-mail (Roach, 2000). Moreover, a study by the United Negro College Fund found that only one out of six students at HBCU had access to or owned a personal computer, compared to one out of every two White students at White institutions (Chappell, 2001). When comparing Internet use in 2003, 65.1% of White Americans used the Internet in comparison to 45.6% of Black Americans and 37.2% of Hispanics in the U.S. (NTIA, 2004).

Students who have unlimited access to technology at school and/or at home tend to be more knowledgeable and have more computer experience than those that do not (Zeliff, 2004). In an underprivileged environment, be it school or home, the hardware and software needed to increase computer use is often nonexistent. If students have limited access to computers, it may have an impact on their frequency of computer use. In turn, the frequency of computer use may impact whether a student accepts or uses a computer-related technology such as an e-learning system.

### Statement of the Problem

The use of web-based learning to supplement post-secondary classroom instruction has increased since the introduction of the PC and the Internet. Institutions have adopted e-learning systems to assist in content delivery within these courses. While many empirical studies have been conducted concerning faculty adoption of these technologies in their classrooms, a limited number have addressed the extent to which college students accept these tools. The majority of these studies failed to consider computer access as a factor regarding computer technology acceptance.

### Purpose of the Study

In addition to the concern of student acceptance of e-learning systems, technological access and computer use seem to be major hurdles for educators to overcome. Many students who would like to take advantage of the benefits of e-learning are unable to do so or find it difficult because of limited technological resources. In many instances, the underlying reason for this problem involves the socioeconomic status (SES) of an individual resulting in the digital divide (Glenn, 2005). Considering that there is a disparity among those who do and do not have access to computers, it warrants an investigation to determine whether computer access has an impact on the acceptance of an e-learning technology. The research questions used to guide this study were as follows:

1. To what extent is e-learning technology acceptance explained by computer access after controlling for the effects of race and socioeconomic status (SES)?

2. To what extent is e-learning technology acceptance explained by Internet access after controlling for the effects of race and SES?

### Assumptions and Delimitations

This study was bounded and delimited by a number of assumptions or parameters. The study targeted a subset of college students for whom the acceptance of technological innovations appears to be important and useful. Business majors were chosen because they tend to use computers extensively (Groneman, 2004). Only business students who were enrolled in an introductory business course or a business communication course were selected to participate. Through this restriction, students with different majors and those who were not in the specified courses were eliminated. Other findings may have resulted if different majors or courses had been chosen.

This study was confined to only two institutions in North Carolina that are accredited by the Association to Advance Collegiate Schools of Business (AACSB), an international association. Non-accredited institutions may have different academic goals or missions that do not include e-learning.

An additional limitation was the data gathering method. The study was limited to information gathered from self-reported data. In quantitative studies, a questionnaire is often used in research to elicit perceptions and attitudes. Survey research is a method that requires the researcher to derive descriptive, behavioral, and preferential data so that the “differential complexities of the population from which a sample has been drawn” can be obtained (Rea & Parker, 1997, p. 4). Because of the data collection method, this study was also limited to students of instructors who were willing to relinquish class time for

data gathering. Only students from the classes of those participating instructors were included. Thus, the results of this study can only be generalized to business students from the two participating universities.

### Significance of the Study

Using e-learning to enhance education or as a form of alternate education is a valuable teaching technique that is being utilized throughout the world. Its popularity has resulted in e-learning initiatives at the local and the federal government levels. This study focused on the different variables that affect the acceptance of e-learning technology by college students. Its significance lies in the ability to provide pertinent information concerning the issues that contribute to a student's acceptance and use of an e-learning tool. Additionally, this study examines the issue of computer and Internet access and determines whether these variables impact students' acceptance of e-learning technology. This key finding could give administrators and educators insight on whether supplying students with additional access to computers and/or the Internet will increase students' willingness to engage in e-learning tools. If so, the magnitude of computer/Internet access by students may be a factor to consider when promoting e-learning courses.

Findings from this study may cause business educators to make program changes and modifications to their current curricula to address the issue of technology use by students. The findings may also determine whether additional research is needed to address the technological needs of students in efforts to close the technological gap that potentially exists between students from various socioeconomic backgrounds at the postsecondary level.

## Definitions of Terms

Terms defined here are used throughout the text with the specific meaning stated below.

*Chat or threaded discussion:* form of online communication that allows students to post and view classroom questions and responses.

*Course management software:* web-based system that enables students and educators to engage in e-learning.

*E-learning:* term is used to help describe the various uses of technology for learning, teaching, training, and wider knowledge management (Rowlands, 2003).

*E-learning system:* web-based delivery applications that are used to assist in the management and facilitation of teaching and learning in a course.

*Hybrid course or web enhanced course:* face-to-face course that incorporates online technology into the traditional classroom instruction (Theriot, 2004).

## Organization of the Study

This dissertation is divided into five chapters. The first chapter includes an introduction, statement of the problem, purpose of the study, assumptions and limitations of the study, significance of the study, definitions used in the study and the organization of the study. The review of literature and theoretical framework are presented in the second chapter. Chapter 3 includes the research methodology. In Chapter 4, the survey results are presented. The final chapter presents a discussion of the findings, conclusions, and recommendations for practice and further research.

## CHAPTER 2

### REVIEW OF LITERATURE

This study was designed to determine the role of computer and Internet access on student acceptance of e-learning technology by college students and to understand factors that relate to technology acceptance. The review begins with the evolution of distance education in US institutions, the emergence of e-learning, and the definition of course management software. The basis of the study is outlined by a discussion of the Technology Acceptance Model (Davis, Bagozzi, & Warshaw, 1989) and the digital divide.

#### Distance Education

Distance education has traditionally been defined as education in which teachers and learners are separated by time and distance. Because of new technologies such as the PC, the Internet and the World Wide Web, distance education has changed to become more learner centered by providing learners more control over their learning (Imel, 1998). Distance education can be delivered through a variety of methods from four major categories:

- Voice-telephones, audio conferencing, short-wave radio, and one-way audiotapes
- Video-film, slides, videotapes, and videoconferencing
- Computer-assisted instruction, computer-managed instruction, web applications, internet-based instruction
- Print-textbooks, study guides, workbooks, and case studies (Willis, 1993).



Of these major instructional tools, Internet-based learning has become the main way to deliver distance learning curricula due to more powerful personal computers, increased bandwidth, and new software packages that are easy to learn and use (Phipps & Merisotis, 2000).

The popularity of distance education has caused fierce competition among educational institutions across the country. According to the National Center for Educational Statistics, more than 50% of public universities offered distance learning and online courses (Snow, Farris, & Levin, 1999). Consequently, school administrators are forcing educators to create and deliver online courses as quickly as possible. The National Education Association (2000) conducted a survey of 402 of its higher education members and revealed that one in 10 of them taught a distance learning course. The rapid increase in online courses in higher education has sparked the question concerning whether college students learning from a distance receive instruction comparable to that received by traditional on-campus students.

There has been an abundance of research comparing traditional learning and distance learning. A vast majority of studies revealed no significant difference between the two methods of instruction. In an early study beginning in 1986, Hiltz (1997) compared traditional students (N=193) to virtual classroom students (N=183) from undergraduate courses in sociology, communication, English composition, management, computer science, mathematics, and statistics. His results were based on two years of a three-year project for Internet courses which included video. He used various methods of evaluation including questionnaires, direct observation of online activities, interviews with students, and comparisons of grades. Hiltz (1997) concluded that 47% of the virtual

classroom students felt the virtual classroom increased the efficiency of educational delivery, while 23% felt that it did not. Fifty-eight percent of them felt that the virtual classroom increased the quality of their education.

Smeaton and Keogh (1999) compared the use of digitally-recorded lectures with traditional lectures presented to undergraduate students. Log-file analysis and pre-course/post-course questionnaires used indicated that no significant difference existed in attainment levels as measured by end of semester exam scores. The results showed that mode of delivery, student usage, and prior computer experience had no impact on overall exam performance (Smeaton & Keogh, 1999).

In addition, Glenn (2001) investigated differences between distance education students (N=101) and on-campus students (N=101) using samples from a population of political science students. A multiple-choice pretest and posttest were administered to measure student progress. A survey instrument was used to determine student perceptions. Once again, the results indicated that no significant difference existed between pretest and posttest performance scores of the two groups. There was also no significant difference in student perceptions between the on-campus group and the distance education group.

The most influential research resulted in the no significant difference phenomenon, reported by Russell in 1999. Russell reviewed 355 studies on distance education that were written from 1928 to 1998. The comparative study included a review of technical articles, reports, and dissertations that documented the effect of technology on learning. Russell analyzed student grades, test scores, frequency of interaction between students and faculty, and other factors to measure differences that exist between

technology-based instruction and traditional classroom instruction. The meta-analysis compared some form of performance measure and/or student satisfaction. Based on the meta-analysis of the studies, Russell concluded that there were no significant differences between the technology-mediated groups and the traditional classroom instruction groups (1999).

Despite the large number of comparison studies touting the effectiveness of distance learning, many critics continue to have reservations about this mode of instruction. One concern with distance learning, as with traditional classroom instruction, is that if a course is not developed effectively, it may not accommodate the learning style of each learner. Students learn in a variety of ways, which means that there should be a variety of methods utilized when transferring knowledge online (Bennett, 2001; James & Voigt, 2001). Another issue regarding distance learning is the lack of student-to-student interaction as well as student-to-teacher interaction (Ryan, Carlton, & Ali, 1999). Some courses lack the opportunity for face-to-face interaction, which is a crucial element of learning in traditional settings. Some argue that this limitation could make it difficult for students to interact and connect with one another on an educational level.

In addition to the aforementioned concerns about distance learning, some researchers believe that these comparison studies are poorly designed and tend to use student outcome as the only dependent variable (Meyer, 2002). A comparison of distance learning instruction and traditional instruction is merely a comparison of two different instructional media, not a comparison of actual comprehension by students (Clark, 1994).

According to Lockee, Moore, and Burton (2002), a more effective method to evaluate distance education systems include conducting formative and summative

evaluations. Formative evaluation issues include instructional design issues such as teaching strategies and interface design issues like website navigation. Summative evaluation involves collecting evidence at the conclusion of the course. Lockee et al. (2002) concluded that the major areas of summative evaluation are program inputs, performance, attitude, and programmatic outcomes, and implementation. Distance education learner concerns such as access to delivery systems, interaction with faculty and interaction with peers were important implementation considerations (Lockee et al., 2002).

### Electronic Learning

Regardless of the controversy concerning distance education, many institutions have embraced the concept of electronic learning (e-learning) as a way to remain competitive in this information age (Arabasz & Baker, 2003). E-learning is a form of distance education that does not simply encompass online education (Schank, 2001; Rowlands, 2003; McArthur, Parker & Giersch, 2003). This broad, umbrella term is used to help describe the various uses of technology for learning, teaching, training, and wider knowledge management (Rowlands, 2003). It represents a large set of teaching and learning options that institutions and faculty members can choose from and practice (McArthur et al., 2003). Although e-learning does not require learning materials to be delivered by computer, the computer and the network must hold a significant involvement in the learning activity (Tsai & Machado, n.d.).

There are many different blends of e-learning such as web-displayed, hybrid, and online modes of instruction. However, web-enhanced courses have become a mainstay in higher education. In Web-enhanced courses, classroom instruction is the main delivery

method; however, it has Web-displayed components that may include online lectures and/or interaction, chat or threaded discussions, and online assessments (McArthur, et al., 2003). Many institutions are opting for this method because it incorporates the use of technology in addition to providing students with the traditional benefits of classroom instruction such as face-to-face student-teacher interaction and student-to-student interaction.

### Course Management Software (CMS)

To help facilitate the development of online and web-enhanced courses, several institutions have adopted course management software or e-learning systems. E-learning systems are web-based delivery applications that assist in managing a course. Typical e-learning systems, such as Blackboard, WebCT, and Web Course in a Box, provide various communication and management tools to facilitate learning in a web-based setting. Educators can post announcements, assignments, and educational content as well as create and post online assessments. They can also track student performance, gauge student interaction, and manage student files. Blackboard is one of the most popular e-learning systems used by higher education institutions because it provides the framework for course delivery (Perreault, 2004; Olsen, 2004). The popularity of this platform is based mainly on the fact that educators can utilize this system without having any computer programming experience (Elorriaga, n.d.; Getty, Burd, Burns, & Piele, 2000). The user-friendly graphical user interface, which allows for ease of implementation, is another major benefit of this software (Cartwright, 2000).

## Technology Acceptance Model

There have been numerous theories regarding the acceptance of an innovation. One prominent social theorist, Everett Rogers (1962), constructed the theory of perceived attributes which defines the five innovation attributes used to determine the rate of innovation adoption: relative advantage, compatibility, complexity, trialability and observability. The theory's premise is that an innovation will experience an increased rate of diffusion if it meets the following criteria (Rogers, 1962):

- The innovation offers discernible results
- The innovation is compatible with existing practices and values
- The innovation is not overly complex
- There is a trial period for the innovation
- The innovation has an advantage relative to others

Davis, Bagozzi, and Warshaw (1989) expanded on Rogers' complexity attribute and introduced the Technology Acceptance Model (TAM). TAM is an adaptation of the Theory of Reasoned Action (TRA), a widely researched model developed by Fishbein and Ajzen (1975) involving the determinants of consciously intended behaviors. According to this theory, a person's performance of a specified behavior is determined by his or her behavioral intention to perform the behavior. In conjunction, behavioral intention is determined by the person's attitude and subjective norm concerning the behavior in question (Fishbein & Ajzen, 1975). While TRA is a well-researched model that predicts and explains behavior across a broad array of domains, TAM specifies this general model by focusing on computer usage behavior. It proposes that the more a user "perceives a new technology to be easy to use and useful, the stronger will be their attitude towards the technology, and the greater will be their intention to use the technology" (Stoel & Lee, 2003, p. 365).

Specifically, TAM promotes that two particular beliefs, perceived usefulness and perceived ease of use, are of primary relevance for computer acceptance behaviors. Perceived usefulness (U) is defined as the user's subjective probability that using a specific application system will increase his or her performance. Perceived ease of use (EOU) refers to the degree to which the user expects the application system to be effortless. TAM proposes that one's behavioral intention to use computers (BI) is determined by the person's attitude toward using the application system (A), perceived ease of use (EOU) and perceived usefulness (U) (Davis, Bagozzi, & Warshaw, 1989).

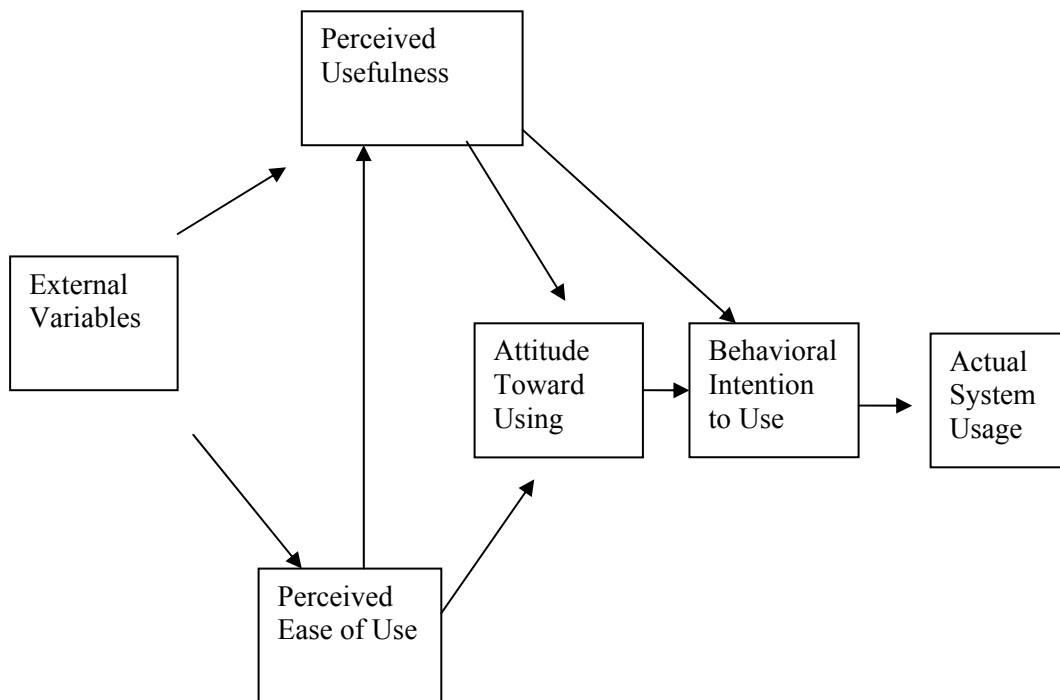


Figure 1. Technology Acceptance Model (Davis et al., 1989)

TAM has been widely used for predicting the acceptance, use and adoption of information technologies (Fenech, 1998; Igbaria, Guimaraes, & Davis, 1995; Lederer,

Maupin, Sena, & Zhuang, 2000). While many of these empirical studies validate the use of TAM in a business environment, few studies have tested TAM in the educational setting.

One university conducted study by Selim (2003) used the course website acceptance model (CWAM), which is the TAM model applied to course website technology. The CWAM uses the TAM constructs of usage, usefulness, and ease of use to investigate course website acceptance by university students. In this model, three constructs, course website usefulness (CWU), course website ease of use (CWEOU), and course website usage (CWUSE) are used. CWU is the “belief that using course websites will increase their learning performance, efficiency, and effectiveness” (Selim, 2003). CWEOU is the degree to which the user expects the use of the course website to “be free of effort” (Davis et al., 1989). CWUSE is the intention to use the course website. According to Selim (2003), based on this model, students will accept course websites as learning and teaching support technology if they perceive that the technology will help them improve their learning effectiveness and efficiency. Selim distributed a survey instrument to 450 undergraduate students, conducted exploratory and confirmatory factor analyses using structural equation modeling techniques, and concluded that the CWAM model was a good fit to the data. The constructs proved to be key indicators of the acceptance and usage of course websites as an effective learning technology by university students (Selim, 2003).

### The Digital Divide

With the advent of the personal computer in the 1970s, the enhancement of software applications in the 1980s and the emergence of the World Wide Web in the



1990s, technology has created a new world of learning at all levels of education.

Although technology has greatly improved the educational process, it has become evident that not all students are reaping the benefits of technology in our public schools. With the dawning of the information age, it is evident that there is a disparity among technology usage between different socioeconomic groups. The review of literature involving the digital divide tends to evolve around two central themes: computer access and Internet access.

Prior research regarding computer access revealed inequalities of technology access in relation to variables such as race/ethnicity, education, geography, income, age and disability. Studies focusing on race/ethnicity revealed that underserved communities including Hispanics, African-Americans and Native Americans were less likely to have home access to a computer and the Internet than their White counterparts (Hoffman & Novak, 1998; National Telecommunications and Information Administration [NTIA], 1999). The National Telecommunication and Information Administration (NTIA) published a study from 1997 data obtained from the US Census Bureau. The data were compiled from 48,000 door-to-door surveys (NTIA, 1999). The results revealed that White households were more than twice as likely (40.8%) to own a computer than Black (19.3%) or Hispanic (19.4%) households. When factoring income levels, Whites were more likely to have computers (76.3%) than Blacks (64.1%) even at the \$75,000 or higher income level. Additionally, Whites (21.2%) were nearly three times as likely to have Internet access compared to Blacks (7.7%) or Hispanics (8.7%).

Using the Spring 1997 CommerceNet/Nielsen Internet Demographic Study (IDS) primary data, Hoffman and Novak (1998) examined racial differences in Internet access

and use of 5,813 respondents in the US aged 16 and over. The study concluded that Whites were more likely than African Americans to have a home computer and slightly more likely to have computer access at work. In an additional study using the IDS data, Hoffman and Novak (1999) focused on the differences in Web usage and access among different ethnic and socioeconomic groups at three different points in time between the spring of 1997 and the spring of 1998. The findings confirmed previous studies that revealed disparities in home computer access as well as school computer access.

More recent literature regarding computer access reveals more promising statistics. According to a study conducted by the National Center for Education Statistics (NCES) (2005), great improvements have been made in providing computer access to U.S. students in the public classroom. The study used a survey to determine the availability and use of technology in schools. The results revealed 99% of US public schools offered Internet access, up from 3% in 1994. Not only has there been a surge in Internet access among schools, the number of instructional computers per child has also improved. The researcher for this study concluded that in 2003, the ratio of students to computers with Internet access was 4.4 to 1 in contrast to a 12 to 1 ratio in 1998.

Although tremendous strides have been made in recent years regarding technology in public schools, differences in the use of computers continue to exist when students return home. Home computer access is a major problem for many disadvantaged students. According to another study conducted by the NCES (2003a), 41% of Blacks and Hispanics use a computer at home compared to 77% of Whites. In addition, families earning less than \$20,000 are less likely to use computers at home (31%) than those

families earning more than \$75,000 (89%). These statistics suggest that the digital divide continues to exist and that the root cause may lie in economic status.

There are a limited number of empirical research studies concerning the issue of computer access. One international study conducted by Carey, Chisholm and Irwin (2002) compared computer access and attitudes of 829 business and education students from five geographic locations including the United States. The study revealed that computer access has an impact on how college students perceive and feel about computers. The greater the access, the more positive are the students' attitudes towards technology.

Another study using the data obtained from the Computer and Internet Usage Supplement to the 2001 Current Population Survey was conducted by Robert Fairlie (2003) to study the impact of home computer access and student enrollment past the mandatory age. This survey administered by the US Census Bureau and the Bureau of Labor Statistics, obtained data from approximately 50,000 households in the U.S. Analyzing data from this study, Fairlie (2003) concluded that there is a positive correlation between owning a home computer and high school enrollment past the mandatory age. More than 95% of children among the ages of 16-18 with home computers were enrolled in school whereas only 85.4% without home computers were enrolled in school. Attewell and Battle (1999) used the 1988 National Educational Longitudinal dataset to provide evidence that test scores and grades were positively related to home computer use. After controlling for demographic differences and individual characteristics, students with home computers had test scores that were 3% to 5% higher than those who did not have home computers.

More recently, O'Dwyer, Russell, Bebell, and Tucker-Seeley (2005) examined the relationship between home and school computer use and the English/language-arts scores of elementary students. Using individual test scores, item level achievement data, and student/teacher survey responses, the researchers examined the relationship between technology use and performance of 986 fourth-grade students from 55 intact classrooms throughout 9 school districts in Massachusetts. According to the study, after controlling for prior achievement and socioeconomic status, students who reported greater frequency of technology use for editing in school were likely to have higher total English/language arts tests scores as well as higher writing scores (O'Dwyer et al., 2005).

While providing more individuals with public access to computers may have seemed to be an effective solution to bridging the digital divide, it has become evident that this approach is not enough. A research study conducted at Carnegie Mellon University revealed that even though people were provided computers and Internet connections, many stopped using the computers when faced with technical problems (Blau, 2002).

### Summary

An investigation of the distance education literature provided the background involving e-learning. Additional review of the literature revealed the technology acceptance model developed by Davis et al. (1989), which provides the theoretical framework for this study to understand the factors that influence student acceptance of e-learning technology by college students. According to Davis and other researchers, these factors include perceived usefulness, perceived ease of use, and attitude. Literature

related to the digital divide revealed other factors such as computer access that may have an impact on technology acceptance.

## CHAPTER 3

### METHODOLOGY

The use of web-based learning to supplement post-secondary classroom instruction has increased since the introduction of personal computers and the Internet. Institutions have adopted e-learning systems to assist in content delivery within these courses. While many empirical studies have been conducted concerning faculty adoption of these technologies in their classrooms, a limited number have addressed the extent to which college students accept these tools. The majority of these studies failed to consider computer access as a factor regarding computer technology acceptance.

In addition to the concern about student acceptance of e-learning systems, technological access and computer use seem to be a major hurdle for educators to overcome. Many students who would like to take advantage of the benefits of e-learning are unable to do so or find it difficult because of limited technological resources (Glenn, 2005). In many instances, the underlying reason for this problem involves the socioeconomic status (SES) of an individual resulting in the digital divide. Glenn (2005, p. 10) stated that the digital divide is a “gap between those who do and those who don’t have access to modern information technology.” Considering that there is a disparity among those who do and do not have access to computers and the Internet, it warrants an investigation to determine whether computer and Internet access have an impact on the acceptance of an e-learning technology. The research questions used to guide this study were as follows:

1. To what extent is e-learning technology acceptance explained by computer access after controlling for the effects of race and socioeconomic status (SES)?

2. To what extent is e-learning technology acceptance explained by Internet access after controlling for the effects of race and SES?

To answer these questions, hierarchical regression was used. A hierarchical regression model allowed the researcher to determine how computer and Internet access contributed to explaining the variance in technology acceptance. The interaction between the race and SES variables in the model eliminated the need for additional research questions.

This chapter indicates the methods used to answer the research question. It specifically describes the research design, population, instrument, pilot study of the instrument, data collection procedures, and data analysis.

### Design of Study

A quantitative research approach was used to determine the degree of computer access and use by business students as well as other factors that influence technology acceptance of e-learning technology. Quantitative research is done to determine relationships, effects, and causes and is more theory-based (Wiersma, 2000). According to Glathorn (1998), survey research is used to seek to assess attitudes, perceptions, and opinions of business students. Using the prior work of Davis, Bagozzi, & Warshaw (1989) as the foundation for this study, a survey instrument modeled after Stoehl and Lee (2003) was designed and utilized for data collection.

## Population

To conduct this study, the target population consisted of students at accredited historically Black colleges and universities (HBCU) and students at predominately White institutions. The sampling frame included business students at an historically Black institution (School A) and business students at a predominately White institution (School B) located in North Carolina. To ensure a sample of subjects who participate in technology, business majors enrolled in business-related courses were selected. To obtain contact information for the sample, all professors in the School of Business and Economics at both universities who taught introductory business courses or business communication courses were contacted via e-mail. These particular courses were selected because these courses are both requirements for all business majors at both institutions.

The sample for the study was determined by first identifying the number of students enrolled in each of the departments within the two Schools of Business and Economics. Using a method of stratifying the sample, the researcher ensured a proportional representation of the entire business school at each university. Stratified sampling is used when the population to be sampled is not homogeneous, but consists of several subpopulations (Wiersma, 2000). Information regarding the subpopulations is included in Figures 2 and 3. Considering the small population of business students at both universities (1400 students and 2000 students respectively), an effect size of .20 was used. According to Dillman (2000), a sample size of 278 is appropriate for a sampling group of 1000 or a sample size of 322 for a group of 2000. Because the study focused only on business majors; the researcher planned for a larger sample size to reduce sampling error. Thus, the researcher attempted to survey 300 business students from



School A and 400 business students from the School B, divided proportionally to have a 20% representation from each department.

Department	Student Major	.20 X enrollment	Sample size by Department
Accounting	325	65	65
Business Administration	929	186	203*
Business Education	58	11	11
Economics & Transportation	103	21	21
Total	N= 1415	283	n=300

Figure 2. Sample Selection Using Proportional Allocation-School A

Department	Student Major	.20 X enrollment	Sample size by department
Accounting	351	70	70
Business Administration	1309	262	267*
Information Systems & Operations Management	218	43	43
	98	20	20
Economics			
Total	N= 1976	395	n=400

Figure 3. Sample Selection Using Proportional Allocation-School B

\*Additional number of respondent were assigned to the largest departments to equal the total desired numbers.

## Instrumentation

Using the Technology Acceptance Model (TAM) and the Course Website Acceptance Model (CWAM) as the framework, the E-learning Technology Acceptance (*ETA*) questionnaire was designed (Appendix A). The survey was modeled after a survey instrument developed by Stoehl and Lee (2003). Stoehl and Lee created a survey instrument to “study the effect of student experience with Web-based learning technologies on their acceptance of those technologies” (2003, p. 364). Davis, Bagozzi, and Warshaw’s technology acceptance model was used as the framework for developing the instrument (1989). The scale items used in the model were tested by Davis et al. for content validity and reliability in two studies involving a total of 152 users and four application programs. The measures resulted in two six-item scales with reliabilities of .98 for usefulness and .94 for ease of use (Davis et al., 1989).

The Hollingshead (1975) four-factor index of socioeconomic status (SES) was utilized to measure SES. This scale, widely used in the social sciences (Cirino, Chin, Sevcik, Wolf, Lovett & Morris, 2002), uses parents’ education level and occupation of the parents to measure SES. These constructs are used to determine potential social connection, influence, and power of the respondents. Income was not used to measure SES, but was utilized as descriptive information about the participants.

A paper version of the survey was chosen to deliver the survey instrument. Using an electronic survey would possibly result in a biased sample considering the nature of the study. Because one of the constructs to be examined is computer access, some

students may not have access to a computer and may be less likely to respond to an electronic survey.

The instrument was divided into six sections. The first section of the questionnaire elicited demographic and self-identified computer and Internet access information from the participants. The second section included questions regarding the education level and occupation of the parents of the participants. The third section contained 14 items designed to measure the perceived usefulness of the Internet and Blackboard. Blackboard is the electronic learning course management system adopted by both the universities where the study was conducted. A Likert scale was used to elicit participants' responses on a scale from 1 to 5 (strongly disagree to strongly agree). The fourth section included 12 items measuring the participants' perceived ease of use regarding the Internet and Blackboard. A Likert scale ranging from "strongly disagree" to "strongly agree" was employed. The fifth section contained 6 items concerning the participants' attitude about the two technologies. Once again, a Likert scale ranging from 1 to 5 was used. The sixth section elicited responses involving the participants' intention to use the Internet and Blackboard. Scales ranging from strongly disagree to strongly agree (1 to 5) were used.

#### Pilot Study

To insure the quality of the survey, a pilot test study was conducted using a group of 20 participants to determine the length of time needed to complete the *ETA*, as well as to indicate questions or directions that needed revision. The researcher administered the survey instrument to college business students in the pilot test during a class session upon receiving participant consent. The results of the pilot study prompted

the researcher to revise some of the open-ended demographic questions to multiple-choice questions in an effort to obtain complete responses from the participants.

The pilot study was also utilized to test for content validity and reliability of the scale items. The 14-item perceived usefulness scale resulted in a reliability of .95. The Cronbach's alpha for the 12-item ease of use scale was .92. The 6-item attitude and 9-item intention to use scales resulted in Cronbach's alpha levels of .86 and .85 respectively.

### Data Collection

The researcher obtained permission from the Institutional Review Board at Virginia Tech (Appendix B), School A (Appendix C), and School B (Appendix D) prior to implementing the study. School A is a predominately Black accredited university located in North Carolina. School B is a predominately White accredited institution also located in North Carolina. These two schools were selected as the locations for data collection by the researcher.

The survey was administered to students enrolled in selected introductory business courses and business communication courses at School A and School B during the Spring 2005 semester. The sections of the courses used for the study were selected randomly from a course offerings list obtained from the universities. A personnel list was used to contact the faculty to request permission to visit the classes (Appendix E). After receiving responses back from business instructors agreeing to participate, class visits were scheduled by the researcher. Because the agreement of the instructors was required for the students in their classes to participate, this constituted a convenience sample.

The researcher administered the surveys during each class visit to all students willing to participate. Students were notified that participation was voluntary. Students who chose not to participate were asked to sit quietly or work on other assignments until the process was complete. During administering of the questionnaires, students were encouraged to ask questions if needed. Class visits by the researcher continued until the list of instructors willing to allow class visits was exhausted.

A coding system was used to eliminate the potential for duplication of respondents. Students were asked to include the last 4 digits of their student identification number on the survey. The researcher discarded any surveys that were duplicates. In addition, the researcher asked each student if they had taken the survey before. If so, the student was instructed not to take the survey a second time.

### Analysis of Data

Correlational relationship design was used to analyze the data obtained. The survey approach was selected due to the quantitative nature of the study. Data were analyzed through statistical methods including descriptive analysis using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics was used to organize, summarize and describe the responses of the participants. In addition, hierarchical regression was used to determine how computer access contributed to explaining the variance in technology acceptance by business students. The general threshold of significance for the statistical methods used was set at the .05 alpha level.

## Summary

This chapter outlined methods that were used to conduct this research study. A discussion of the population and the development of the survey instrument were included. A description of the pilot study and the procedures that were used to collect and analyze the data was also discussed. The next chapter presents the findings obtained from the study.

## CHAPTER 4

### FINDINGS

The purpose of this study was to determine the influence of computer and Internet access on e-learning technology acceptance of business students. Taking advantage of e-learning technology in education has been stifled by the socioeconomic (SES) gap that exists regarding technological tools (Glenn, 2005). Because previous research has indicated that race and SES are factors concerning the digital divide, the following questions will establish whether computer and Internet access has an impact on the acceptance of e-learning technology.

1. To what extent is e-learning technology acceptance explained by computer access after controlling for the effects of race and socioeconomic status (SES)?
2. To what extent is e-learning technology acceptance explained by Internet access after controlling for the effects of race and SES?

### Respondents

The population for this study included 3391 business students at two accredited universities (referred to as School A and School B) located in North Carolina. Using stratified sampling and an effect size of .20, a sample sizes of 283 and 395 were determined for School A and School B respectively (See Figures 2 and 3 in Chapter 3). To reduce sampling error, the goal of the researcher was to collect 300 surveys from School A and 400 surveys from School B. To collect the data, business faculty members teaching introductory business courses were contacted to participate in the study. The business instructors were asked permission to administer the surveys during class time.

Using a list of instructors who agreed to participate, class visits were scheduled and conducted. Out of the researcher's goal to collect 300 surveys from School A, 303 surveys were collected. Two hundred eighty-five (285) surveys from the goal of 400 were collected from School B. Of those obtained, 5 questionnaires were incomplete. The majority of the students in the classes agreed to participate in the study. The 5 incomplete questionnaires were from those students who decided against participation. Therefore, 583 surveys were used in the data analysis.

The lack of participation may be contributed to the data collection method. Ten of the instructors contacted were reluctant to relinquish class time by allowing the researcher to administer the questionnaires during class. In an effort to increase participation for School B, a follow-up e-mail was sent to the instructors who chose not to participate (Appendix F). The researcher also phoned the instructors to encourage participation. These methods resulted in the cooperation of two additional professors.

### Characteristics of the Sample

Overall, 583 business students provided usable responses to the E-learning Technology Acceptance (ETA) survey during the spring semester of 2005. Table 1 shows the class standing and age of the respondents who completed the questionnaire. Of the students who responded from School A, 61% were freshmen and sophomores. Forty-six percent from School B were freshmen and sophomores. From those who responded from School B, 53% were upperclassmen (juniors, seniors and graduates). Only 38% of the respondents from School A were upperclassmen. Overall, most of the students who responded (62%) were between the ages of 18-20. From School A, 71% of the



respondents were between the ages of 18-20, whereas 52% of the respondents from School B were in that age range. Finally, only 2% of the overall respondents were 36 years of age or over.

Table 1

*Descriptive Statistics: Class Standing (n=583) and Age (n=582)*

	School A	School B	Total
	N (%)	n (%)	n (%)
Class Standing			
Freshmen	100 (33%)	106 (37%)	206 (35%)
Sophomore	84 (28%)	25 (9%)	109 (19%)
Junior	81 (27%)	58 (20%)	139 (24%)
Senior	33 (11%)	51 (18%)	84 (14%)
Graduate	1 (1%)	43 (15%)	44 (8%)
Age			
18-20 years old	213 (71%)	146 (52%)	359 (62%)
21-23 years old	64 (21%)	67 (24%)	131 (23%)
24-26 years old	7 (2%)	32 (11%)	39 (7%)
27-35 years old	10 (3%)	26 (9%)	36 (6%)
36 years or older	4 (1%)	9 (3%)	13 (2%)

*Note:* Totals may not equal 100% due to rounding.

A slight majority of students who responded from School A (52%) and School B (57%) were males. Forty-eight percent of the respondents from School A and 43% from School B were female, indicating that the gender ratio of the respondents from both schools was similar. However, the ethnicity compositions for the two schools were quite different. The majority (95%) of the respondents from School A classified themselves as Black whereas the majority (69%) of respondents from School B reported themselves as being White. A total of 30% of the respondents from School B reported being Asian (5%), Black (21%), and Hispanic (4%), representing a variety of ethnic backgrounds. School A included a small percentage of Asians (1%), Hispanics (.6%) and Whites (2%), indicating a limited ethnic composition. Table 2 includes detailed descriptive statistics of the respondents' gender and ethnicity.

The respondents in this study were asked to report their total family income using a scale that ranged from under \$10,000 to \$200,000 or more. Due to the wording of the question, it could not be determined whether the reported income was that of the respondent's family of origin or that of the individual respondent. For the purpose of this study, it was assumed that the responses from the students were referring to their parent's income. See Table 3. Only 6% of the overall respondents from both schools reported an income under \$10,000. A total of 41% of the respondents from School A reported an income under \$35,000, whereas only 26% of those from School B reported income in these ranges. While 21% of the respondents from School B reported having an income from \$100,000 to \$200,000 or more, none of the respondents from School A reported

being in this income range. This suggests that overall the respondents from School B were in higher income brackets than those in School A.

The respondents reported their grade point averages (GPA) using a scale ranging from below 2.0 to between 3.5 and 4.00. Only 4% of the overall respondents from both schools reported having below a 2.0 grade average. From School A, 66% of the respondents had a GPA between 2.5-3.49, and 58% from School B reported grade point averages in this range. While only 14% of School A respondents had a GPA ranging from 3.5-4.00, 23% of School B respondents reported having a GPA within this range. See Table 4.

Only 11% of the overall respondents from both schools reported not owning a computer. Fifteen percent of the respondents from School A reported not owning a computer and 8% from School B did not have a computer. When asked whether they have Internet access, only 4% of the overall respondents reported not having Internet access. Four percent of the respondents from each school reported not having access to the Internet. (See Tables 5 and 6 respectively.)

Table 2

*Descriptive Statistics: Gender and Ethnicity (n=583)*

	School A	School B	Total
	N (%)	n (%)	n (%)
Gender			
Male	155 (52%)	160 (57%)	315 (54%)
Female	145 (48%)	123 (43%)	268 (46%)
Ethnicity			
Asian	4 (1%)	14 (5%)	18 (3%)
Black	284 (95%)	60 (21%)	344 (59%)
Hispanic	2 (1%)	10 (4%)	12 (2%)
Pacific Islander	0 (0%)	2 (.7%)	2 (< 1%)
White	6 (2%)	195 (69%)	201 (34%)
Other	4 (1%)	2 (1%)	6 (1%)

*Note:* Totals may not equal 100% due to rounding.

Table 3

*Descriptive Statistics: Family Income (n=544)*

Income	School A	School B	Total
	N (%)	n (%)	n (%)
Under 10,000	17 (6%)	16 (6%)	33 (6%)
10,000-14,999	23 (8%)	10 (4%)	33 (6%)
15,000-24,999	34 (12%)	19 (7%)	53 (10%)
25,000-34,999	44 (15%)	24 (9%)	68 (13%)
35,000-49,999	52 (18%)	43 (17%)	95 (18%)
50,000-75,000	60 (21%)	47 (19%)	107 (20%)
75,000-99,999	60 (21%)	43 (17%)	103 (19%)
100,000-149,999	0 (0%)	30 (12%)	30 (5%)
150,000-199,999	0 (0%)	7 (3%)	7 (1%)
200,000 or more	0 (0%)	15 (6%)	15 (3%)

*Note:* Totals may not equal 100% due to rounding.

Table 4

*Descriptive Statistics: GPA (n=577)*

GPA	School A	School B	Total
	N (%)	n (%)	n (%)
Below 2.0	9 (3%)	14 (5%)	23 (4%)
2.0-2.49	53 (18%)	40 (14%)	93 (16%)
2.5-2.99	110 (38%)	75 (27%)	185 (32%)
3.0-3.49	83 (28%)	88 (31%)	171 (29%)
3.5-4.00	40 (14%)	65 (23%)	105 (18%)

*Note:* Totals may not equal 100% due to rounding.

Table 5

*Descriptive Statistics: Computer Ownership (n=583)*

Own a Computer	School A	School B	Total
	N (%)	n (%)	n (%)
Yes	256 (85%)	260 (92%)	516 (89%)
No	44 (15%)	23 (8%)	67 (11%)

*Note:* Totals may not equal 100% due to rounding.

Table 6

*Descriptive Statistics: Access to Internet (n=581)*

Internet Access	School A	School B	Total
	N (%)	n (%)	n (%)
Yes	289 (96%)	273 (96%)	562 (96%)
No	11 (4%)	10 (4%)	10 (4%)

*Note:* Totals may not equal 100% due to rounding.

## Data Analysis

### *Measures*

The students' acceptance of electronic learning technology was measured using the E-learning Technology Acceptance (ETA) survey. The instrument included 41 items that measured the acceptance of e-learning technology tools on a 5-point Likert-type scale from "5 = strongly agree" to "1= strongly disagree." The instrument had four subscales: perceived usefulness, perceived ease of use, attitude, and intention to use. The perceived usefulness (PU) scale consisted of 14 Likert-type items that measured the perceived usefulness of the Internet and Blackboard.

The PU construct had a Cronbach's alpha ( $\alpha$ ) of .82 and a range of mean scores from 2.50 to 3.45 with standard deviations between .83 and 1.56. Table 7 displays detailed descriptive statistics for each item of the PU construct. The questions related to the perceived usefulness of the Internet received the highest levels of agreement with mean scores ranging from 3.00 to 3.45.

Table 8 displays statistics for the ease of use (EU) construct ( $\alpha = .82$ ). This 12-item scale had mean scores ranging from 3.03 to 3.36 with standard deviations between .76 and 1.73. The highest level of agreement for this construct was for the statement, "Learning to use the Internet is easy," with a mean of 3.36 and a standard deviation of .83.

The attitude (A) scale ( $\alpha = .83$ ) consisted of 6 Likert-type items that measured students' attitudes toward using Blackboard and the Internet. The mean scores ranging from 2.95 to 3.56 and standard deviations ranging from .64 to .94 are reported in Table 9.

Table 7

*Perceived Usefulness of Blackboard and the Internet (n=583)*

Item	M	SD
Using the Internet enables me to accomplish study tasks more quickly.	3.45	0.83
Using the Internet improves the quality of the assignments I do.	3.22	0.83
Using the Internet gives me greater control over my studies.	3.16	0.86
Using the Internet makes it easier to study and learn.	3.10	0.93
Using the Internet improves my learning productivity.	3.09	1.26
Using the Internet improves my grade.	3.01	1.56
Using the Internet enhances the effectiveness of my study activities.	3.00	1.01
Using Blackboard gives me greater control over my studies.	2.88	0.95
Using Blackboard enables me to accomplish study tasks more quickly.	2.80	1.16
Using Blackboard makes it easier to study and learn.	2.76	0.99
Using Blackboard enhances the effectiveness of my study activities.	2.66	1.54
Using Blackboard improves my learning productivity.	2.65	1.00
Using Blackboard improves the quality of the assignments I do.	2.60	1.55
Using Blackboard improves my grade.	2.50	1.53

*Note:* Scale values ranged from Strongly Agree = 5 to Strongly Disagree = 1.

Table 8

*Ease of Use of Blackboard and the Internet (n=582)*

Item	M	SD
Learning to use the Internet is easy.	3.36	0.83
My interaction with the Internet is clear and understandable.	3.33	0.83
Getting the information from the Internet is easy.	3.29	0.80
Becoming skillful at using the Internet is easy.	3.29	0.77
Becoming skillful at using Blackboard is easy.	3.25	0.78
Getting the information from Blackboard is easy.	3.24	0.78
Learning to use Blackboard is easy.	3.23	0.96
I believe that it is easy to get the Internet to do what I want it to do.	3.21	1.53
It is easy for me to remember how to perform tasks using Blackboard.	3.20	1.20
My interaction with Blackboard is clear and understandable.	3.18	0.84
It is easy for me to remember how to perform tasks using the Internet.	3.17	1.73
I believe that it is easy to get Blackboard to do what I want it to do.	3.03	1.20

*Note:* Scale values ranged from Strongly Agree = 5 to Strongly Disagree = 1.



Table 9

*Attitude Toward Blackboard and the Internet (n=583)*

Item	M	SD
I like using the Internet.	3.56	0.81
The Internet is easy to use.	3.56	0.64
The Internet provides an attractive learning environment.	3.33	0.78
Blackboard is easy to use.	3.23	0.80
I like using Blackboard.	2.96	0.91
Blackboard provided an attractive learning environment.	2.95	0.94

*Note:* Scale values ranged from Strongly Agree = 5 to Strongly Disagree = 1.

As indicated in Table 9, the questions related to attitude toward the Internet received the highest levels of agreement with mean scores ranging from 3.33 to 3.56.

Students' intention to use Blackboard and the Internet was measured by the intention to use (IU) construct ( $\alpha = .83$ ). It included 9 Likert-type items with a Cronbach's alpha of .83, mean scores ranging from 2.50 to 3.52 and standard deviations ranging from .72 and 1.16. See Table 10. The highest rating (3.52) was for the item, "I intend to use the Internet for research to complete projects for this class," while the lowest rating (2.50) was for the item, "I intend to use Blackboard to discuss results of assignments."

Table 10

*Intention to Use Blackboard and the Internet (n=583)*

Item	M	SD
I intend to use the Internet for research to complete projects for this class.	3.52	0.72
I intend to use Blackboard to access readings and reference materials for this class.	3.24	0.90
I intend to use Blackboard to look at my grades.	3.23	0.98
I intend to use the Internet to find out how industry uses the concepts I learn in this class.	3.09	1.06
I intend to use the Internet to find explanations of material to supplement the textbook in this class.	3.07	0.95
I intend to use Blackboard to study for assignments in this class.	3.01	1.00
I intend to use Blackboard to access the class calendar.	2.88	1.06
I intend to use Blackboard to e-mail classmates and instructors.	2.80	1.16
I intend to use Blackboard to discuss results of assignments.	2.50	1.16

*Note:* Scale values ranged from Strongly Agree = 5 to Strongly Disagree = 1.

Socioeconomic status (SES) was measured by calculating a SES score based on a formula derived by Hollingshead (1975). This score was computed by multiplying the scale value of parents' occupations reported by respondents by a weight of five and the scale value for parents' education reported by respondents by a weight of three (Hollingshead, 1975). For example, the SES score for one parent would be computed:

Scale	Factor Score	Weight	Score X Weight
Occupation	6	5	30
Education	5	3	15
Total Score =			45

Once computed, the scores were added together and divided by two if both parents were employed. The values for both the occupations and education levels were based on the work of Will Barnett (2003) who created the Modified Hollingshead Scale (see Appendix G). Additionally, the computed SES score were categorized into five SES categories (Rains, 2003):

SES category	Range of SES Scores	Social Strata
1	55 to 66	Major business and professional
2	40 to 54	Medium business, minor professional, technical
3	30 to 39	Skilled craftsmen, clerical, sales workers
4	20 to 29	Machine operators, semiskilled workers
5	7 to 19	Unskilled laborers, menial service workers

Categories for computer and Internet access were created by first computing summated scores using the sum of the responses for question 2 (In which of the following places do you use a computer? Check all that apply.) and question 5 (In which of the following places do you have access to the Internet? Check all that apply.). For each question, the respondents had 7 choices from which to select. The total summated scores for each question ranged from 0 to 7 depending on how many choices the respondent

selected. The summated scores were then recoded and placed in separate variables to designate the level of computer and Internet access of each student. These categorical variables placed the level of computer and Internet access into three categories:

1=limited, 2=moderate and 3=high. If the summated scores ranged from 0-2, it was placed in the limited category. Summated scores ranging from 3-4 were placed in the moderate category. The high category included summated scores ranging from 5-7.

Computer and Internet use were measured in a similar fashion. Categorical variables were created to categorize the responses of question 3 (How frequently do you use a computer? Check one.) and question 6 (How frequently do you use the Internet? Check one.). Depending on the summated scores, the frequency of computer and Internet use by respondents was also placed into three categories: 1=limited, 2=moderate and 3=high. The summated scores ranging from 0-2, 3-4, and 5-6 were placed in the limited, moderate and high categories respectively.

Because computer access and Internet access are categorical variables, the data from the respondents was dummy coded. Pedhazur (1997) explained that categorical variables can be entered into a regression analyses provided that they are appropriately coded. Since the categorical independent variables in this study have more than three categories, the dummy variables that correspond to these categorical variables were entered together as a set. In the hierarchical regression analysis, these categorical variables were examined to determine how the variables contribute to the change in R-square. Figure 4 displays the coding procedure for creating the dummy variables.

Dummy Coding “Key” with Moderate Access as the reference group		
	Code ACCDUM1 as:	Code ACCDUM2 as:
When ACC = 1 (limited)	1	0
When ACC = 2 (moderate)	0	0
When ACC = 3 (high)	0	1

Figure 4. Dummy Coding Procedure for Computer and Internet Access Variables

#### *Analysis of Data Related to Research Questions*

The research questions used to guide this study relate to the extent to which e-learning technology acceptance is explained by computer access and by Internet access, after controlling for the effects of race and socioeconomic status (SES). To address these questions, multiple regression analysis was used to determine the relationship between independent variables and the dependent variables of this study. Hierarchical regression was performed to test whether or not the variables of interest explain variance above and beyond race and SES. According to the theoretical framework, race and socioeconomic status both influence technology acceptance. Thus, to control for these two independent variables, they were entered first in the regression model. Computer access, one variable of interest, was entered last. Because the dependent variable, technology acceptance, includes several distinct factors, one regression analysis was conducted for each of these factors or dependent variables.

Internet access was also tested in the regression model. This model also used the theoretical framework which suggests that race and socioeconomic status both influence technology acceptance, so these two independent variables were entered first. The other

variable of interest, Internet access, was entered last. One hierarchical regression analysis for each technology acceptance dependent variable was conducted.

## Results

Research Question 1: To what extent is e-learning technology acceptance explained by computer access after controlling for the effects of race and socioeconomic status (SES)?

The results of the hierarchical regression for perceived usefulness revealed that of the variance explained by Model 2 ( $R^2 = .045$ ,  $F(6, 418) = 3.30$ ,  $p < .05$ ), computer access explains only 1.2% ( $R^2 \text{ change} = .012$ ,  $F \text{ change}(4, 418) = 1.32$ ,  $p > .05$ ) of the variance of perceived usefulness above and beyond the variance explained by race and socioeconomic status. These nonsignificant results are shown in Table 11.

The regression analysis for the ease of use variable ( $R^2 = .070$ ,  $F(6, 418) = 5.28$ ,  $p < .001$ ) revealed that computer access significantly explains 6.4% ( $R^2 \text{ change} = .064$ ,  $F \text{ change}(4, 418) = 7.17$ ,  $p < .001$ ) of the variance of ease of use above and beyond the variance explained by race and socioeconomic status. These findings are displayed in Table 12.

Table 11

*Results of the Hierarchical Regression of the Perceived Usefulness Variable in Regard to Computer Access*

	R Squared Change	F-Change	Significance
Model 1	.033	7.22	.001
SES, Race			
Model 2	.012	1.32	.262
computer access			

Table 12

*Results of the Hierarchical Regression of the Ease of Use Variable in Regard to Computer Access*

	R Squared Change	F-Change	Significance
Model 1	.007	1.42	.243
SES, Race			
Model 2	.064	7.17	<.001
computer access			

The results of the regression Model 2 for the attitude variable ( $R^2 = .086$ ,  $F(6, 418) = 6.58$ ,  $p < .001$ ) showed that computer access significantly explains 7.4% ( $R^2$  change = .074,  $F$  change (4, 418) = 8.47,  $p < .001$ ) of the variance of attitude above and beyond the variance explained by race and socioeconomic status. These results are shown in Table 13.

The results of the hierarchical regression for the intention to use variable revealed that of the variance explained by Model 2 ( $R^2 = .024$ ,  $F(6, 418) = 1.69$ ,  $p > .05$ ), computer access only explains 1.6% ( $R^2$  change = .016,  $F$  change (4, 418) = 1.71,  $p > .05$ ) of the variance of intention to use above and beyond the variance explained by race and socioeconomic status. These nonsignificant findings are shown in Table 14.

Research Question 2: To what extent is e-learning technology acceptance explained by Internet access after controlling for the effects of race and socioeconomic status (SES)?

Hierarchical regression for the perceived usefulness variable indicated that of the variance explained by Model 2 ( $R^2 = .047$ ,  $F(5, 419) = 4.10$ ,  $p < .05$ ), Internet access explains only 1.3% ( $R^2$  change = .013,  $F$  change (3, 419) = 1.89,  $p > .05$ ) of the variance of perceived usefulness above and beyond the variance explained by race and socioeconomic status. Table 15 displays the results in detail.

The results of Model 2 ( $R^2 = .045$ ,  $F(5, 419) = 3.94$ ,  $p < .05$ ) for the ease of use variable revealed that Internet access significantly explains 3.8% ( $R^2$  change = .038,  $F$  change (3, 419) = 5.59,  $p < .05$ ) of the variance of ease of use above and beyond the



variance explained by race and socioeconomic status. These findings are shown in Table 16.

Table 13

*Results of the Hierarchical Regression of the Attitude Variable in Regard to Computer Access*

	R Squared Change	F-Change	Significance
Model 1 SES, Race	.012	2.60	.075
Model 2 computer access	.074	8.47	<.001

Table 14

*Results of the Hierarchical Regression of the Intention to Use Variable in Regard to Computer Access*

	R Squared Change	F-Change	Significance
Model 1 SES, Race	.008	1.64	.196
Model 2 computer access	.016	1.71	.147

Table 15

*Results of the Hierarchical Regression of the Perceived Usefulness Variable in Regard to Internet Access*

	R Squared Change	F-Change	Significance
Model 1	.034	7.39	.001
SES, Race			
Model 2	.013	1.89	.131
Internet access			

Table 16

*Results of the Hierarchical Regression of the Ease of Use Variable in Regard to Internet Access*

	R Squared Change	F-Change	Significance
Model 1	.007	1.43	.239
SES, Race			
Model 2	.038	5.58	.001
Internet access			

The regression analysis related to attitude revealed that of the variance explained by Model 2 ( $R^2 = .062$ ,  $F(5, 419) = 5.50$ ,  $p < .001$ ), Internet access significantly explains 4.9% ( $R^2 \text{ change} = .049$ ,  $F \text{ change}(3, 419) = 7.32$ ,  $p < .001$ ) of the variance of attitude above and beyond the variance explained by race and socioeconomic status. These significant findings are detailed in Table 17.

Hierarchical regression for the intention to use variable showed that of the variance explained by Model 2 ( $R^2 = .025$ ,  $F(5, 419) = 2.19$ ,  $p = .05$ ), Internet access only explains 1.7% ( $R^2 \text{ change} = .017$ ,  $F \text{ change}(3, 419) = 2.45$ ,  $p > .05$ ) of the variance of intention to use above and beyond the variance explained by race and socioeconomic status. These nonsignificant results are revealed in Table 18.

Table 17

*Results of the Hierarchical Regression of the Attitude Variable in Regard to Internet Access*

	R Squared Change	F-Change	Sig.
Model 1	.013	2.68	.070
SES, Race			
Model 2	.049	7.31	<.001
Internet access			

Table 18

*Results of the Hierarchical Regression of the Intention to Use Variable in Regard to Internet Access*

	R Squared Change	F-Change	Sig.
Model 1	.008	1.79	.169
SES, Race			
Model 2	.017	2.45	.063
Internet access			

## Summary

This chapter reported the findings of the research study. Descriptive statistics revealed the demographic characteristics of the business students. A majority of students from School A were freshmen and sophomores and under the age of 20 whereas a larger percentage of the students from School B were juniors, seniors, and graduate students and over the age of 20. The ethnicity compositions for both schools revealed that the majority of students from School A were Black and the majority of students from School B were White, with School B having a more varied mix of ethnicities. The family income reported by the respondents indicated that more of the respondents from School B were in higher income brackets than those of School A. While only a small percentage of the overall respondents from both schools reported not owning a computer, the percentage of respondents from School A who did not own a computer was almost double the percentage for School B.

Hierarchical regression revealed no significant explained variance in perceived usefulness or intention to use e-learning technology tools for computer and Internet access. However, the analysis did indicate that computer and Internet access significantly explained students' beliefs about the ease of use of e-learning technology and their attitudes concerning the e-learning technology tools. A summary and discussion of the findings are presented in Chapter 5.

## CHAPTER 5

### SUMMARY, CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

This final chapter presents a summary of the completed research, review of the research findings, and conclusions and discussion. Recommendations for future practice and research are also provided.

#### Summary of the Study

##### *Purpose and Significance*

Electronic learning (e-learning), the use of technology in education, has become a mainstay in today's postsecondary educational system (Arabasz & Baker, 2003). The Internet and course management systems, such as Blackboard and WebCT, have been utilized to assist in the learning process. Unfortunately, limited technological resources have hindered some institutions and students from participating in e-learning. Not having access to e-learning tools and/or the technical skills to use the e-learning tools are some of the challenges faced by students (Arabasz & Baker, 2003). Prior research has shown that one underlying reason for lack of access involves the race and socioeconomic status (SES) of an individual (Hoffman & Novak, 1998; Hoffman & Novak, 1999; NTIA, 1999; Glenn, 2005). Because of the technology access disparity that exists, this study was conducted to investigate whether computer access and Internet access has an impact on the acceptance of an e-learning technology. The research questions used to guide this study were as follows:

1. To what extent is e-learning technology acceptance explained by computer access after controlling for the effects of race and socioeconomic status (SES)?
2. To what extent is e-learning technology acceptance explained by Internet access after controlling for the effects of race and SES?

Focusing on the different variables that impact e-learning technology acceptance by college students will provide valuable information about their willingness to engage in the use of e-learning tools. These findings will provide insight regarding whether additional access to computers and/or the Internet might increase students' willingness to engage in e-learning tools.

### *Participants*

This study was delimited to students enrolled in accredited business programs at two universities, referred to as School A and School B, in North Carolina. The target population consisted of students at historically Black colleges and universities (HBCU) and students at predominately White institutions. The sampling frame included 3391 business students at the two universities. Stratified sampling was used determine the sample sizes of 300 from School A and 400 from School B, divided proportionally to have a 20% representation from each department (See Figures 2 and 3 in Chapter 3). The researcher collected 300 usable surveys from School A and 283 usable surveys out of the targeted 400 were collected from School B. Because of the data collection method, conducting class visits, participation was limited to business faculty willing to participate

in the study. This resulted in the researcher not meeting the goal of collecting 400 surveys from School B.

### *Instrumentation*

The E-Learning Technology Acceptance (ETA) instrument was developed using the Technology Acceptance Model (TAM) (Davis, et al. 1989) and Selim's (2003) Course Website Acceptance Model (CWAM) as guides (See Appendix A). The survey was modeled after a questionnaire developed by Stoehl and Lee (2003). Stoehl and Lee created the instrument to study student Web-based technology experience and its effect on technology acceptance. The Hollingshead (1975) four-factor index, used to measure socioeconomic status (SES), was also included in the ETA.

The instrument was divided into six sections and included 56 questions. The first section included demographic questions and those that elicited self-identified computer and Internet access information from the participants. The second section included questions regarding the education level and occupation of the parents of the participants. Sections 3-6 included questions designed to measure the four technology acceptance constructs: perceived usefulness, perceived ease of use, attitude, and intention to use. Likert scales ranging from strongly disagree to strongly agree (1 to 5) were used for these questions. The instrument was piloted tested for validity and reliability. Based on the pilot test, revisions were made in an effort to obtain complete and accurate responses from participants.



### *Data Collection*

The researcher contacted all the instructors who taught selected introductory business courses and business communication courses at School A and School B during the Spring 2005 semester. A personnel list was used to contact the faculty to request permission to visit the classes (Appendix E). Class visits were scheduled to administer the survey to the members of the classes of all business instructors who agreed to participate. The researcher continued to conduct class visits until the list of instructors willing to allow class visits was exhausted. To increase participation from School B, a follow-up e-mail was sent to the instructors who chose not to participate (Appendix F). The researcher also phoned the instructors to encourage participation. These follow-up procedures resulted in the cooperation of two additional professors. The response rate for School A was 100% of the targeted goal (303 out of 300) and 71% of the targeted goal (283 out of 400) for School B.

### *Characteristics of Respondents*

A total of 583 business students from School A and School B provided usable responses to the E-learning Technology Acceptance (ETA) survey. The majority (61%) of students from School A were lower classmen (freshmen and sophomores), while 46% of the students from School B were lower classmen. Of the students who responded from School A and School B, a slight majority were males (52% and 57% respectively). The different ethnic composition of the two schools was made evident from the respondents of this study. The majority (95%) of the respondents from School A classified themselves

as Black, whereas the majority (69%) of respondents from School B reported themselves as being White.

The total family incomes reported by the students from School B were in higher income brackets than those in School A. While only 26% of the respondents from school B reported family income under \$35,000, a total of 41% of the respondents from School A reported incomes in these ranges. Although none of the respondents from School A reported having a family income from \$100,000 to \$200,000 or more, 21% of students from School B reported having an income in these ranges. Because of the way the question was asked, it could not be determined whether the reported income was that of the respondent's family of origin or that of the individual respondent. For the purpose of data analysis, the researcher made the assumption that the responses about family income referred to the parents' income.

While only 4% of the respondents from each school reported not having Internet access, 11% of the overall respondents from both schools reported not owning a computer. Fifteen percent of the respondents from School A reported not owning a computer, but only 8% from School B did not have a computer. It is unclear whether the reported computer ownership and Internet access were long-term or only since the respondents began college.

### *Data Analysis*

Descriptive statistics were used to organize, summarize and describe the responses of the participants using SPSS. Hierarchical regression analysis was used to determine the relationship between the independent variables (race, SES, computer

access, and Internet access) and the dependent variables (perceived usefulness, perceived ease of use, attitude, and intention to use) of this study. Two regression models were performed to compute the variance of each set of added variables. Model 2 of the hierarchical regression used the theoretical framework which suggests variables such as race and socioeconomic status both influence technology acceptance. These two independent variables were entered first to control for them. The variable of interest, computer access was entered last. Separate regression analysis was conducted for each dependent variable. These steps were repeated to test Internet access in the regression model.

### *Findings*

#### Research Questions:

1. To what extent is e-learning technology acceptance explained by computer access after controlling for the effects of race and socioeconomic status (SES)?
2. To what extent is e-learning technology acceptance explained by Internet access after controlling for the effects of race and SES?

E-learning technology acceptance was measured using four constructs: perceived usefulness, perceived ease of use, attitude, and intention to use. The results of the hierarchical regression for perceived usefulness revealed that computer access insignificantly explained only 1.2% of the variance of perceived usefulness above and beyond the variance explained by race and socioeconomic status (See Table 11). Internet access only explained 1.3% of the variance of perceived usefulness (See Table 15). These

findings indicate that computer access and Internet access did not impact students' belief that using e-learning technology tools (Blackboard and the Internet) will improve class performance.

Regression analysis of the ease of use variable concluded that computer access significantly explained 6.4% of the variance of ease of use above and beyond the variance explained by race and socioeconomic status. Internet access significantly explained 3.8% of the variance of ease of use. These results revealed that computer and Internet access did affect the degree to which the students expect Blackboard and the Internet to be easy to use. See Table 12 and Table 16 respectively for detailed statistics.

The regression model for the attitude variable showed that computer access significantly explained 7.4% of the variance of attitude above and beyond the variance explained by race and socioeconomic status. Internet access significantly explained 4.9% of the variance of the attitude variable. These results, displayed in Table 13 and Table 17, indicate that computer and Internet access does significantly impact the students' attitude toward using Blackboard and the Internet.

The hierarchical regression for the intention to use variable revealed that computer access only explained 1.6% of the variance of intention to use and Internet access only explained 1.7% above and beyond the variance explained by race and socioeconomic status. These nonsignificant results show that neither computer access nor Internet access significantly affected the students' intention to use Blackboard and the Internet. (See Tables 14 and 18 respectively.)

## Conclusions, Discussion and Educational Implications

### *Digital Divide*

While the findings from this study did not clearly reveal whether a digital divide regarding computer use existed among the respondents based on their socioeconomic status, several conclusions can be made about this issue. Overall, a small percentage of the respondents of this study reported a lack of computer ownership and Internet access. However, the students from the predominately White institution (School B) had a higher level of computer ownership than the students from the predominately Black institution (School A). In addition, the students from School B had higher family incomes than those from School A. These findings suggest that socioeconomic status (SES) and race may be indicators of computer access.

To increase computer ownership of minority and low-income students, several schools districts have implemented programs to provide computers and/or Internet access to students at home. For instance, an independent school district in Plano, TX provided about 450 students with older model surplus computers that were no longer used (Vail, 2003). In Arlington, VA, a grant project called “Computers in the Home” provided students with refurbished computers for their homes (Shapiro, 2005). Another school district in Chapel Hill, NC developed a home-loaner program, in which students were provided “thin clients” instead of computers. These are small boxes that include Internet connection, word processing, e-mail and other educational software programs. The boxes, which are missing hard drives and floppy disk drives, cost approximately \$250 each (Vail, 2003). These types of initiatives and programs can be implemented at the postsecondary level to assist in providing computer access to higher education students.

In an underprivileged school or institution in which a large number of students are without home computers, it may become virtually impossible to provide every student with a home computer. The US Department of Education developed an initiative that promotes programs that demonstrate the effective use of technology by providing technology centers in urban and rural areas as well as economically distressed communities. The Community Technology Centers network is a US-based network of more than 1000 organizations that help provide community technology centers at the local, national and international level. These centers can be used by students to access information technology and related learning services. Postsecondary educators should make college students knowledgeable of these types of resources so that they can be utilized by the higher education community.

#### *Ease of Use Perceptions about Blackboard and the Internet*

Based on the results of this study, another conclusion that can be drawn is that the degree of computer and Internet access that business students have impacts their perceptions about how easy it is to use e-learning tools such as the Internet and course management systems, specifically Blackboard. Whether students perceived Blackboard and the Internet to be easy to use was also influenced by the frequency of computer and Internet use. As might be expected, this suggests that perceived ease of use of Blackboard and the Internet may increase as students spend more time using the computer and the Internet. Levine and Donitsa (1998) concluded that more computer use has a positive effect on perceived computer self-confidence. In addition, Reznich (1996) revealed that increased computer use decreased anxiety in word processing courses. Therefore, when

teaching e-learning courses, instructors should consider the level of computer access and Internet access students have. This could affect the strategies and assignments instructors use when delivering the course. In addition, students who are contemplating enrolling in distance learning courses should consider their level of computer/Internet access before making this decision. Considering this factor may improve their potential for success in e-learning courses by assuring that the students feel comfortable using the technology.

To gain information about technology access, an assessment could be utilized to determine the locations and the frequency of computer and Internet access for students. E-learning instructors should administer such an assessment to their students at the beginning of each semester. The results of this assessment could enable the instructors to make adjustments to ensure that each student has enough exposure to the e-learning technologies needed to complete the course successfully.

In addition to administering the assessment at the beginning of the semester, an assessment should be posted on the distance learning website of the institution. Placing it on the university website will enable potential e-learning students to be aware of their level of accessibility to e-learning technology tools. Providing information on the website explaining how computer/Internet access may have an impact on students' attitude and their perception about the ease of using the e-learning delivery system will be helpful in the decision-making process for these students.

#### *Attitudes about Blackboard and the Internet*

Another conclusion that can be drawn from this study is that students' attitudes toward using Blackboard or the Internet are impacted by their level of computer and

Internet access. Students' feelings about using these technological tools may be influenced by whether they own a computer or the amount of computer and Internet access they have on their campus. The findings of this study were in agreement with prior research that has shown that a positive attitude toward computers is a crucial factor in helping students to learn computer technologies (Anderson & Reed, 1998; Zhang & Espinoza, 1998). Thus, initiating strategies to increase computer and Internet access may improve student attitudes, which may in turn impact students' ability to learn using e-learning technologies.

### *Beyond the Digital Divide*

Another interesting finding was the results of the hierarchical regression model regarding perceived usefulness. While the results revealed insignificant findings about whether computer access influences student perceptions of the extent to which Blackboard and the Internet are useful in improving class performance, the results did indicate that SES and race significantly impacted the students' perceptions of the usefulness of these tools. In addition to this finding, the results of this study revealed that computer access does not influence students' intention to use e-learning technology.

These findings suggest that computer access is not enough to close the digital divide. Research has shown that simply providing students with technology does not guarantee that the students will use it (Blau, 2002). Thus, the more realistic issue that needs to be addressed is digital inclusion. Ensuring that all individuals, regardless of their socioeconomic status, have access to and are using the technological tools in this digital



age should be a concern for our society. To be productive members of our society and to compete in the increasingly global economy, we must all be digitally connected.

To assist in the movement toward digital inclusion, career and technical educators must provide students with the technical skills needed to use the technology. Educators must also equip students with critical thinking skills to make decisions. These lifelong learning skills will ensure that students can stay abreast of current technologies that evolve. In addition, individuals need access to diverse and meaningful content on the Internet. People from diverse backgrounds will not find information on the World Wide Web to be relevant and useful if it is void of information pertaining to their culture.

#### Recommendations for Further Research

Based on the findings and conclusions for this study, the following recommendations for further research are presented.

Age was not considered a variable of interest in this study. However, it is important to mention that the respondents from School A were generally younger than those in School B. Because more students in School B owned computers than students in School A, it would be interesting to investigate whether the level of computer and Internet access is influenced by generational age. According to Karuppan (2001), younger students are more likely to use the Internet than older students. It would be interesting to determine whether older people have different experiences with technology than younger people.

After analyzing the responses of the participants in this study, the data revealed that the highest levels of agreement on the statements that related to acceptance of the

Internet as opposed to Blackboard. Considering that Blackboard is one of several commercially marketed course management systems, it may be helpful to investigate whether another system would reveal more positive levels of agreement in regard to technology acceptance. For example, there is an innovative alternative that is called “open source” course management software (Olsen, 2003). Open source course management software is free to users and is developed through partnerships between commercial companies and academic educators from leading technical institutions. If open source course management software is the future trend, it may be helpful to determine the level of acceptance of this type of software among both students and faculty.

The results of this study revealed that computer and Internet access did not significantly influence students’ intention to use Blackboard or the Internet or whether students perceive these tools to be useful. A variation of this study could be conducted to determine the reasons for these findings. Identifying the variables that impact a student’s intention to use e-learning technology in the future could be helpful in promoting e-learning tools at the university level. Similarly, determining what factors influence a student’s belief that technology is useful will assist e-learning educators in developing more effective programs and courses.

Finally, this study investigated the influence of computer and Internet access on technology acceptance while controlling for race and SES. Model 1 of this regression model analyzed the influence of these two variables together. The model revealed that race and SES did significantly influence the perceived usefulness variable but not the other technology acceptance constructs. An international study conducted by Carey,

Chisholm, and Irwin (2002) revealed that of the five nations represented, individuals from the United States and Australia had the highest level of perceived computer usefulness. Individuals from the least wealthy nations, China and Ghana, had the lowest level of perceived computer usefulness. Further research might explore the interaction of race and SES as related to the technology acceptance variables.

### Summary

Information from this study may be beneficial for teachers and students in higher education. The findings provide e-learning educators with the insight to make instructional design changes and modifications when developing and delivering e-learning courses. Because socioeconomic status and race do appear to influence perceived usefulness of the Internet and Blackboard, it may also impact computer ownership. Therefore, educators should take the initiative to seek funding that would assist minority and low income students with obtaining home computers. Computer ownership has a significant impact on students' attitude towards computers (Seyal Afzaal, Rahim, & Rahman, 2000). Providing students with home computers and relevant web-based activities may improve the academic achievement of students (Wenglinsky, 1998).

An international study conducted by Carey, Chisholm, and Irwin (2002) revealed that individuals from wealthier nations perceived computers to be more useful and a higher level of computer access than those from less wealthy nations. Similarly, this study concluded that the degree of computer and Internet access and the frequency of computer and Internet use by business students impacts whether they perceive e-learning

tools to be easy to use. While this study did not analyze race and class specifically, the results did reveal that these variables impacted perceived usefulness of computers. A technology assessment should be utilized by e-learning educators and students to measure the level of computer and Internet access.

Frequent computer use and access will improve students' self-confidence towards computers (Levine & Donitsa, 1998). Similarly, the results of this study revealed that students' feelings about using e-learning tools are influenced by their level of computer and Internet access. While the Levine and Donitsa study investigated high school students, this study focused on college students. To promote positive attitudes regarding e-learning tools, educators should develop strategies to improve the level of computer and Internet access of their students.

Finally, the findings implied that closing the digital divide is not enough to ensure technology acceptance of students. Although race and socioeconomic status did impact students' perceived usefulness of technology, it did not impact students' intention to use technology. Thus, this research suggests that digital inclusion should be the goal of our society and educational systems. Ensuring that all students regardless of race or socioeconomic status have access to and are using technology should be the ultimate concern for our society.

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## APPENDICES

APPENDIX A

E-Learning Technology Acceptance

Survey Instrument

## **The Role of Computer Access in E-learning Technology Acceptance by Business Students**

Because you are a business student, you have been selected to voluntarily participate in a research study. Your responses are critical to gaining insight on students' perceptions of e-learning technology. Your completion of the survey constitutes your consent to participate in the study. Thank you very much for your participation.

**Please answer the following questions about yourself by checking your responses.**

1. Do you own a computer?  
☐ yes      ☐ no
2. In which of the following places do you use a computer? (Check all that apply.)  
☐ at local residence (campus or apartment)    ☐ at permanent residence (parent's or own home)  
☐ at work      ☐ at school  
☐ at public library      ☐ at a local business  
☐ Other, please specify \_\_\_\_\_
3. How frequently do you use a computer? (Check one.)  
☐ daily      ☐ several times a week      ☐ once or twice a week  
☐ once or twice a month      ☐ a few times a year      ☐ never  
☐ Other, please specify \_\_\_\_\_
4. Do you have access to the Internet?  
☐ yes      ☐ no
5. In which of the following places do you have access to the Internet? (Check all that apply.)  
☐ at local residence (campus or apartment)    ☐ at permanent residence (parent's home)  
☐ at work      ☐ at school  
☐ at public library      ☐ at a local business  
☐ Other, please specify \_\_\_\_\_
6. How frequently do you use the Internet? (Check one.)  
☐ daily      ☐ several times a week      ☐ once or twice a week  
☐ once or twice a month      ☐ a few times a year      ☐ never  
☐ Other, please specify \_\_\_\_\_
7. Have you ever used the Blackboard course management system?  
☐ yes \_\_\_\_\_ ☐ no  
If yes, for how many courses? \_\_\_\_\_
8. What is your gender? (Check one.)      ☐ female      ☐ male
9. What is your race/ethnicity? (Check one.)  
☐ Asian      ☐ Black      ☐ Hispanic  
☐ Pacific Islander      ☐ White      ☐ other (please specify) \_\_\_\_\_
10. What is your college major? \_\_\_\_\_

11. What is your class standing? (Check one.)  
☐ freshman      ☐ junior      ☐ graduate student  
☐ sophomore      ☐ senior      ☐ other (please specify) \_\_\_\_\_
12. Are you currently taking the following classes?  
 Business Environment/Introduction to Business      ☐ yes      ☐ no  
 Business Communication      ☐ yes      ☐ no
13. What is your overall GPA?  
☐ below 2.0  
☐ 2.0-2.49  
☐ 2.5-2.99  
☐ 3.0-3.49  
☐ 3.5-4.0
14. What is your age?  
☐ Under 18 years  
☐ 18 – 20 years  
☐ 21 – 23 years  
☐ 24 – 26 years  
☐ 27 – 29 years  
☐ 30-35 years  
☐ 36 years and over
15. What is your family's total annual income (approximately)?  
☐ Under \$10,000  
☐ \$10,000 to \$14,999  
☐ \$15,000 to \$24,999  
☐ \$25,000 to \$34,999  
☐ \$35,000 to \$49,999  
☐ \$50,000 to \$74,999  
☐ \$75,000 to \$99,999  
☐ \$100,000 to \$149,999  
☐ \$150,000 to \$199,999  
☐ \$200,000 or more

Please place an X in the appropriate block for your Mother's and Father's highest level of school completed.

Level of School Completed	Mother	Father
6 <sup>th</sup> grade or less		
7 <sup>th</sup> -9 <sup>th</sup> grade		
10 <sup>th</sup> or 11th grade		
High school graduate		
Partial college (at least one year but less than a bachelor's degree)		
College education (bachelor's degree)		
Graduate or professional degree		

Please place an X in the appropriate block for your Mother's and Father's occupation.

Occupation	Mother	Father
Farm laborer, day laborer		
Unskilled worker, service worker		
Machine operator, semiskilled worker		
Skilled manual worker, craftsman, police and fire services, enlisted military and non-commissioned officers.		
Clerical/sales, small farm owner.		
Technicians, semiprofessional, supervisor, office manager.		
Small business owner, farm owner, teacher, low level manager, salaried worker		
Mid-level manager or professional (for example: architect, engineer, accountant, attorney), mid-sized business owner, military officer.		
Senior manager or professional (for example: physician, college professor, minister) owner or CEO of large business.		

Please answer the questions below by circling the letters that most closely reflect your level of agreement with the statement.

**SA=Strongly Agree A=Agree N=Neutral D=Disagree SD=Strongly Disagree**

**Perceived Usefulness**

Using the Internet:

- |  |             |
|--|-------------|
| 16. enables me to accomplish study tasks more quickly. | SA A N D SD |
| 17. improves my grade.                                 | SA A N D SD |
| 18. gives me greater control over my studies.          | SA A N D SD |
| 19. improves the quality of the assignments I do.      | SA A N D SD |
| 20. improves my learning productivity.                 | SA A N D SD |
| 21. enhances the effectiveness of my study activities. | SA A N D SD |
| 22. makes it easier to study and learn.                | SA A N D SD |

Using Blackboard:

- |  |             |
|--|-------------|
| 23. enables me to accomplish study tasks more quickly. | SA A N D SD |
| 24. improves my grade.                                 | SA A N D SD |
| 25. gives me greater control over my studies.          | SA A N D SD |
| 26. improves the quality of the assignments I do.      | SA A N D SD |
| 27. improves my learning productivity.                 | SA A N D SD |
| 28. enhances the effectiveness of my study activities. | SA A N D SD |
| 29. makes it easier to study and learn.                | SA A N D SD |

Please answer the questions below by circling the letters that most closely reflect your level of agreement with the statement.

**SA**=Strongly Agree **A**=Agree **N**=Neutral **D**=Disagree **SD**=Strongly Disagree

#### **Ease of Use**

- |   |    |   |   |   |    |
|---|----|---|---|---|----|
| 30. It is easy for me to remember how to perform tasks using the Internet.    | SA | A | N | D | SD |
| 31. I believe that it is easy to get the Internet to do what I want it to do. | SA | A | N | D | SD |
| 32. My interaction with the Internet is clear and understandable.             | SA | A | N | D | SD |
| 33. Getting the information from the Internet is easy.                        | SA | A | N | D | SD |
| 34. Learning to use the Internet is easy.                                     | SA | A | N | D | SD |
| 35. Becoming skillful at using the Internet is easy.                          | SA | A | N | D | SD |
| 36. It is easy for me to remember how to perform tasks using Blackboard.      | SA | A | N | D | SD |
| 37. I believe that it is easy to get Blackboard to do what I want it to do.   | SA | A | N | D | SD |
| 38. My interaction with Blackboard is clear and understandable.               | SA | A | N | D | SD |
| 39. Getting the information from Blackboard is easy.                          | SA | A | N | D | SD |
| 40. Learning to use Blackboard is easy.                                       | SA | A | N | D | SD |
| 41. Becoming skillful at using Blackboard is easy.                            | SA | A | N | D | SD |

#### **Attitude**

- |   |    |   |   |   |    |
|---|----|---|---|---|----|
| 42. The Internet is easy to use.                              | SA | A | N | D | SD |
| 43. I like using the Internet.                                | SA | A | N | D | SD |
| 44. The Internet provides an attractive learning environment. | SA | A | N | D | SD |
| 45. I like using Blackboard.                                  | SA | A | N | D | SD |
| 46. Blackboard is easy to use                                 | SA | A | N | D | SD |
| 47. Blackboard provides an attractive learning environment.   | SA | A | N | D | SD |

#### **Intention to Use**

I intend to use the Internet in the future:

- |  |    |   |   |   |    |
|--|----|---|---|---|----|
| 48. for research to complete projects for this class.                          | SA | A | N | D | SD |
| 49. to find out how industry uses the concepts I learn in this class.          | SA | A | N | D | SD |
| 50. to find explanations of material to supplement the textbook in this class. | SA | A | N | D | SD |

I intend to use Blackboard in the future:

- |  |    |   |   |   |    |
|--|----|---|---|---|----|
| 51. to e-mail classmates and instructor.                       | SA | A | N | D | SD |
| 52. to discuss results of assignments.                         | SA | A | N | D | SD |
| 53. to access the class calendar.                              | SA | A | N | D | SD |
| 54. to look at my grades.                                      | SA | A | N | D | SD |
| 55. to access readings and reference materials for this class. | SA | A | N | D | SD |
| 56. to study for assignments in this class.                    | SA | A | N | D | SD |



## APPENDIX B

IRB Approval Letter: Virginia Tech

**Institutional Review Board**

Dr. David M. Moore  
IRB (Human Subjects) Chair  
Assistant Vice President for Research Compliance  
CVM Phase II, Duckpond Dr., Blacksburg, VA 24061-0442  
Office: 540/231-4991; FAX: 540/231-6033  
email: moored@vt.edu

DATE: February 25, 2005

**MEMORANDUM**

TO: Daisy L. Stewart Teaching and Learning 0313  
Ronda Henderson

FROM: David Moore 

SUBJECT: IRB Exempt Approval: "The role of computer access in e-learning technology acceptance by business students" IRB # 05-135

I have reviewed your request to the IRB for exemption for the above referenced project. I concur that the research falls within the exempt status. Approval is granted effective as of February 25, 2005.

Virginia Tech has an approved Federal Wide Assurance (FWA00000572, exp. 7/20/07) on file with OHRP, and its IRB Registration Number is IRB00000667.

cc: File

Department Reviewer: Bonnie S. Billingsley

## APPENDIX C

IRB Approval Letter: School A



**NORTH CAROLINA AGRICULTURAL AND TECHNICAL  
STATE UNIVERSITY**

BIOLOGY DEPARTMENT

February 15, 2005

Dr. Ronda Henderson  
Department of Business Education  
Campus

Refer to: IRB # 05-0000-05-H48

Dear Dr. Henderson:

As required by University policy I have given your educational survey protocol entitled "The role of computer access on technology acceptance of E-learning." (IRB # 05-0000-05-H48) an audit review. Your proposal is exempt from 45 CFR 46 (section 46.101b2) as the study is minimal risk and will only involve adults. As per A&T's Federal Wide Assurance (FWA00000013) with the Office for Protection from Research Risks (OPRR) of the Department of Health and Human Services, all exempt research must be conducted in accordance with the Belmont Report (DHEW Publication No. (OS) 78-0012) which requires voluntary, informed consent from research subjects. You will document obtaining informed consent from your subjects by the use of the submitted consent form. You should be aware that any changes in your protocol must be submitted to the IRB before they are implemented. Likewise, any problems or complaints involving human subjects must be promptly reported to the IRB.

Thank you for your cooperation on this matter and best wishes on your project.

Sincerely,

A handwritten signature in black ink, appearing to read "David W. Aldridge".

David W. Aldridge, IRB Chairperson

cc: Dr. N. Radhakrishnan, Vice Chancellor, Division of Research and Economic Development  
Ms. Lois Deve, DORED  
Dr. Beryl C. McEwen, Chair, Department of Business Education

*A Land-Grant University and A Constituent Institution of the University of North Carolina*  
Barnes Hall • 1601 East Market St. • Greensboro, NC 27411 • (336) 334-7907 • Fax (336) 334-7105

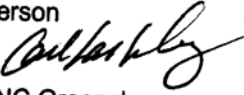
## APPENDIX D

IRB Approval Letter: School B

THE UNIVERSITY OF NORTH CAROLINA  
**GREENSBORO**

*School of Education*  
Department of Educational Leadership  
and Cultural Foundations

March 16, 2005

To: Ronda Henderson  
From: Carl Lashley   
IRB Chair, UNC Greensboro

Subject: Project Approval

The project you have proposed, "The role of computer access in e-learning technology acceptance by business students," is in approvable form for implementation on the UNCG campus. Good luck with your study.

## APPENDIX E

### Data Collection Correspondence

To: <DT\_Winkler@uncg.edu>  
From: "Ronda Henderson" <rondah@ncat.edu>  
Date: 01/25/2005 02:53PM  
Subject: Research Study in School of Business

Dear Dr. Winkler:

In addition to being an instructor at NC A& T State University, I am a graduate student in Career and Technical Education at Virginia Polytechnic Institute and State University completing the requirements for the Doctor of Philosophy degree. I am conducting a research study for my dissertation entitled "The role of computer access on e-learning technology acceptance by business students". I am interested in your students' perceptions of e-learning technology such as course management software like Blackboard.

I need assistance in conducting this research study. I am requesting permission to contact some of your faculty members who teach BUS 100 and MGT 309. I plan to conduct class visits to administer a questionnaire to students enrolled in these courses. The survey will take approximately ten minutes and is completely voluntary.

Participation in this study will help provide insight on whether providing students with additional access to computers and the Internet will increase students' willingness to engage in e-learning or distance education courses. Student responses will be kept confidential and will be destroyed after data analysis has been conducted. I am currently completing the IRB process at your university.

Thank you for your assistance in this matter. Your help is greatly appreciated.

---

Ronda B. Henderson  
Dept. of Business Education  
307 Merrick Hall  
School of Business and Economics  
North Carolina A&T State University  
Greensboro, NC 27411

(336) 334-7657 ext. 7025  
rondah@ncat.edu



## APPENDIX F

### Data Collection Follow-Up Correspondence

Hi Dr. Kaiser-

I just left you voice message concerning my research study. I was hoping that you would reconsider allowing your students to participate. The surveys will take no more than 10 minutes to complete.

I certainly appreciate your consideration in this matter. I will be happy to return the favor in a future research study that you may conduct. Better yet, maybe we could collaborate on something together!

-Thanks  
Ronda

---

Ronda B. Henderson  
Dept. of Business Education  
307 Merrick Hall  
School of Business and Economics  
North Carolina A&T State University  
Greensboro, NC 27411

(336) 334-7657 ext. 7025  
rondah@ncat.edu

## APPENDIX G

### Modified Hollingshead Four Factor Index of Social Status

Modified Hollingshead Four Factor Index of Social Status (Barnett, 2003)

Level of School Completed	Mother	Father
6 <sup>th</sup> grade or less	1	1
7 <sup>th</sup> -9 <sup>th</sup> grade	2	2
10 <sup>th</sup> or 11 <sup>th</sup> grade	3	3
High school graduate	4	4
Partial college (at least one year but less than a bachelor's degree)	5	5
College education (bachelor's degree)	6	6
Graduate or professional degree	7	7

Occupation	Mother	Father
Farm laborer, day laborer	1	1
Unskilled worker, service worker	2	2
Machine operator, semiskilled worker	3	3
Skilled manual worker, craftsman, police and fire services, enlisted military and non-commissioned officers.	4	4
Clerical/sales, small farm owner.	5	5
Technicians, semiprofessional, supervisor, office manager.	6	6
Small business owner, farm owner, teacher, low level manager, salaried worker	7	7
Mid-level manager or professional (for example: architect, engineer, accountant, attorney), mid-sized business owner, military officer.	8	8
Senior manager or professional (for example: physician, college professor, minister) owner or CEO of large business.	9	9

Father	Scale Score	Father Weight	Score X Weight
Education		Times 5	
Occupation		Times 3	
			Total:
Mother	Scale Score	Mother Weight	Score X Weight
Education		Times 5	
Occupation		Times 3	
			Total:
Sum of Father Total and Mother Total	Divide Sum by 2		

## VITA

## **Curriculum Vita**

**Name:** Ronda Henderson

### **Personal Information:**

**Education:** Ph.D.  
Career and Technical Education (Business  
Information Technology)  
Virginia Polytechnic Institute and State University-  
2005

Master of Science in Business Education  
University of North Carolina at Greensboro,  
Greensboro, North Carolina-1996

Bachelor of Science in Business Education  
North Carolina Agricultural and Technical State  
University, Greensboro, North Carolina-1995

**Current Rank:** Business Education Instructor

### **Experience:**

2000-Present Full-time Instructor, Department of Business Education  
North Carolina A&T State University, Greensboro, North  
Carolina

1996-2000 Business Education Teacher, Northwest Middle  
School, Greensboro, North Carolina

1995-1996 Business & Marketing Teacher, Ragsdale High School  
Greensboro, North Carolina

### **Courses Taught:**

Undergraduate: Business Environment  
Microcomputer Usage in Business  
Data Entry Input and Applications  
Business Programming  
Business Programming-Online

## **Scholarship:**

### **Publications:**

- Henderson, R. (2004). The Digital Divide: Does it Exist and Should CTE Educators be Concerned? New Dimensions in Business, Marketing and Information Technology Education. Proceedings of the Annual Atlantic Coast Business, Marketing & Information Technology Education Conference (21st, Raleigh, North Carolina, February 19-20, 2004). (Refereed Proceedings).
- Henderson, R. (2003). Ethical Issues in eLearning: Responsibility of Educators or Parents? Reflecting Past, Present, and Future of Business, Marketing and Information Technology Education. Proceedings of the Annual Atlantic Coast Business, Marketing & Information Technology Education Conference (20th, Raleigh, North Carolina, February 13-15, 2003). (Refereed Proceedings).
- Lomo-David E., Gueldenzoph, L., King, T., and Henderson, R. (2003). Identity Fraud and E-Fraud: Is Advancement in Information Technology Making it Easier? Reflecting Past, Present, and Future of Business, Marketing and Information Technology Education. Proceedings of the Annual Atlantic Coast Business, Marketing & Information Technology Education Conference (20th, Raleigh, North Carolina, February 13-15, 2003). (Refereed Proceedings).
- Gueldenzoph, L. E. & Henderson, R. (2002). IT Certification: The Who, What, When, Where and Why. Pathways to Proficiency in Business & Marketing Education. Proceedings of the Annual Atlantic Coast Business & Marketing Education Conference (19th, Raleigh, North Carolina, February 14-16, 2002). (Refereed Proceedings).

### **Presentations:**

- Henderson, R. (2005, April 22). The Framework for Successful Online Course Development. The Association for Business Communication Spring Conference, Greensboro, North Carolina.
- Henderson, R. (2005, March 31). Breaking Through the Ethnic Barriers of Technology Usage. UNC Teaching and Learning with Technology Conference, Raleigh, North Carolina.

- Henderson, R. (2005, February 18). Home Computer Use: What Can CTE Educators Do? New Dimensions in Business, Marketing and Information Technology Education. Atlantic Coast Business, Marketing & Information Technology Education Conference, Raleigh, North Carolina.
- Henderson, R. (2004, February 20). The Digital Divide: Does it Exist and Should CTE Educators be Concerned? New Dimensions in Business, Marketing and Information Technology Education. Proceedings of the Annual Atlantic Coast Business, Marketing & Information Technology Education Conference, Raleigh, North Carolina.
- Henderson, R. (2003, February 15). Ethical Issues in eLearning: Responsibility of Educators or Parents? Reflecting Past, Present, and Future of Business, Marketing and Information Technology Education. Atlantic Coast Business, Marketing & Information Technology Education Conference.
- Henderson, R. (2003, February 15). Creating Windows Application Using VB 6.0. Reflecting Past, Present, and Future of Business, Marketing and Information Technology Education. Atlantic Coast Business, Marketing & Information Technology Education Conference, Raleigh, North Carolina.
- Henderson, R. (2002, October 19). Business and Its Environment, Praxis Review Workshop, North Carolina A&T State University, Greensboro, NC.
- Henderson, R. (2002, September 27). Ethical Considerations in the Information Age, North Carolina Business Education Association Conference, Winston-Salem, NC.
- Gueldenzoph, L. E. & Henderson, R. (2002, September 27). Computer Certification, North Carolina Business Education Association Conference, Winston-Salem, NC.
- Henderson, R. (2002, February 23). Business and Its Environment, Praxis Review Workshop, North Carolina A&T State University, Greensboro, NC.
- Gueldenzoph, L. E. & Henderson, R. (2002, February 15). IT Certification: The Who, What, When, Where, and Why, 19th Atlantic Coast Business and Marketing Education Conference, Raleigh, NC.



- Henderson, R. (2001, September 28). Introduction to Visual Basic 6.0, North Carolina Business Education Association Conference, Greensboro, NC.
- Henderson, R. (2001, February 23). Business and Its Environment, Praxis Review Workshop, North Carolina A&T State University, Greensboro, NC.
- Henderson, R. (1996, February 6). Using PrintShop Deluxe in the Classroom, Northwest Middle School, Greensboro, North Carolina.

### **Conferences and Workshops**

- Attended the National Business Education Association Annual Convention, Anaheim, CA March 23-25, 2005.
- Attended the Association of Career and Technical Education Annual Convention, Las Vegas, NV, December 10-11, 2004.
- Attended the CTE Teacher Educators Conference, Wilmington, NC, May 12-14, 2004.
- Attended the National Business Education Association Annual Convention, Chicago, IL, April 8-9, 2004.
- Attended Pocket PC Workshop, NC A&T State University, Greensboro, NC, December 1, 2003.
- Attended Voice Recognition Workshop, NC A&T State University, Greensboro, NC, November 24, 2003.
- Participated in the TeachingOntheNet 2003 Online Conference: LERN, June 24-26, 2003.
- Attended Teaching and Technology Workshop: Preparing Tomorrow's Teachers to Use Technology, NC A&T State University, Greensboro, NC, June 10-21, 2002.
- Attended Effective Teaching Workshop, NC A&T State University, Greensboro, NC, February 2, 2002.
- Attended Microsoft Office User Specialist Certification Workshop, Hudson, North Carolina-February, 2001

- Completed Introduction to Visual Basic 6.0, Professional Development Course, Guilford Technical Community College, December, 2000
- Attended North Carolina Business Education Association Conference, Raleigh, North Carolina- June, 2000
- Attended North Carolina Workforce Development Conference, Greensboro, North Carolina- June, 1998
- Attended North Carolina Workforce Development Conference, Greensboro, North Carolina- June, 1997
- Attended North Carolina Educational Technology Conference, Greensboro, North Carolina- February, 1996

### **Public Schools Service and Contact:**

- |           |   |
|-----------|---|
| 1999-2000 | New Teacher Mentor, Northwest Middle School, Greensboro, North Carolina           |
| 1996-2000 | NC Stock Market Game Advisor, Northwest Middle School, Greensboro, North Carolina |
| 1995-1996 | CO-OP Program Coordinator, Ragsdale High School, Greensboro, North Carolina       |

### **Professional and Community Affiliations:**

- Delta Pi Epsilon-member
- National Business Education Association-member
- Association of Career and Technical Education-member
- North Carolina Business Education Association-member
- Southern Business Education Association-member
- Omicron Tau Theta(Iota Chapter)-member
- Business Technology Association- advisor
- Pi Omega Pi Honor Society-member
- Golden Key Honor Society- member
- Mt. Zion Baptist Church Continuing Education Educator
- 2002 NCBEA Conference Planning Committee-member
- 2002 NCBEA Conference Board of Directors
- Curriculum Committee-member
- Recruitment Committee-member
- Online Degree Program Committee-member
- 2000-1996 North Carolina Association of Educators- Association Representative

- McGraw-Hill/Irwin Publishing Company-textbook reviewer

**Certificates and Awards:**

- Rufus W. Beamer Professional Development Award 2004
- North Carolina G Teaching Licensure (2000-2005)
- Microsoft Office User Specialist Certificate in Word 2000
- Microsoft Office User Specialist Certificate in Excel 2000